Ten Significant Weather Events

Below is a list of events in chronological order of significant weather events in Bishop, California. This list is intended to capture extreme events in terms of their place in meteorology and impact on society in Bishop. It is not intended to be all-inclusive and should be considered objective in nature.

Flood of January 25-26, 1914

One of the earliest significant weather events documented in Bishop took place on January 25-26, 1914 when a storm system spread heavy precipitation across the eastern slopes of the southern Sierra Nevada and the Owens Valley. Temperatures stayed above freezing during most of this event, allowing for the precipitation to fall as rain on the valley floor and in the lower elevations of the Sierra Nevada. A total of 5.40 inches of precipitation was measured in Bishop in a 48 hour period ending on January 26th by a cooperative weather observer for the federal government. While there is no direct evidence of it, it is likely given the heavy precipitation totals and above freezing temperatures that some of the flooding may have been enhanced by snowmelt from the Sierra Nevada as well as runoff from precipitation that fell there. Newspaper reports from the *Inyo Independent* mentioned that almost every house in Bishop was damaged by flooding (Kattelmann 1992). Several feet of water covered streets (Figure 18).

Figure 18 - Flooded streets in Bishop on January 25, 1914. Photo credit: Eastern California Museum.

Prolonged Cold and Snow – January 1949

Figure 19 – The Bishop Airport on January 20, 1949. Photo credit: NCDC.

The infamous month of January 1949 (Figure 19) still holds as the coldest month ever on record in Bishop. The average temperature of 23.8 degrees recorded during this month is 3.4 degrees colder than the second coldest month on record which is January 1955. There were 9 days in January 1949 with a high of 32 degrees or below, with an all-time record stretch of 5 consecutive days that featured highs at or below freezing. An all-time record of eight consecutive days with a trace or more of snow was also set this month when snow fell on each day from January 17th through the 24th. A persistent trough in the mid and upper levels of the atmosphere over the western United States was responsible for the prolonged cold experienced during this month.

High Wind Event – May 1, 1950

A cold front and associated upper level trough (Figure 20) passing through the Owens Valley in the afternoon and evening hours generated powerful winds that did around $75,000 in damage to Bishop and surrounding areas (in 1950 dollars). Several planes were overturned at the Bishop Airport. Numerous trees were toppled by the wind and took down power lines or fell on buildings. Some of the fallen power lines started fires that burned brush. Many cars were sandblasted by blowing dust. The highest sustained wind at the Bishop Airport was 40 mph.

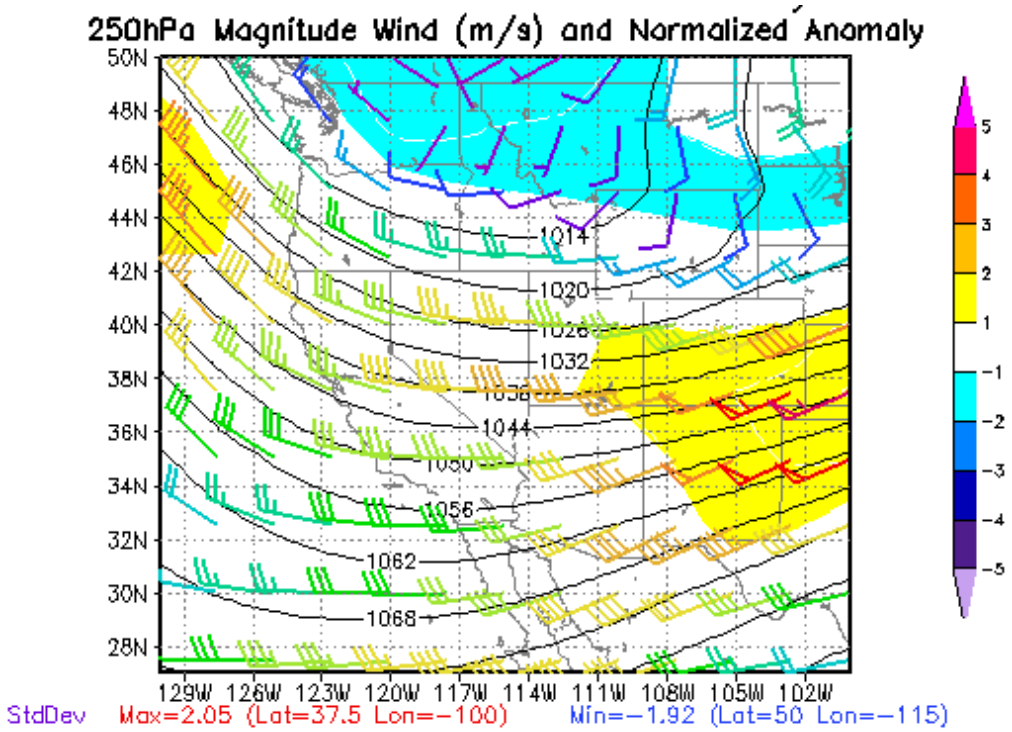


Figure 20 - Renanalysis map showing 250 mb wind barbs and height lines (in black) in decameters at 00Z on May 6, 1950 showing an upper level trough across the western United States. Shaded colors show standardized anomalies. Image courtesy Penn State University.

Biggest Snowstorm Ever, January 23-25, 1969

Bishop's biggest snowstorm ever occurred during a record stretch of nine consecutive days with measurable precipitation. From January 18th through the 26th, a moist flow from the Pacific brought several rounds of precipitation to Bishop. Following a storm system that departed towards the northern and central Rockies on the 22nd, much colder air filtered into the Owens Valley of California. Another storm system approaching from the Pacific Ocean (Figure 21) then spread precipitation into this cold air mass from the 23rd into the 26th. Snow fell starting around 11:00 PM on the 23rd until the morning of January 25th, when snow levels rose due to milder air being pushed into the area courtesy of increasing southerly flow ahead of the approaching storm system. Although precipitation continued to fall into the 26th, the precipitation that fell from mid-morning on the 25th into the 26th was all rain.

The total snowfall at the Bishop Airport was 23.1 inches for January 23rd through the 25th which ranks as the biggest snowstorm ever. The snow depth at 6:00 AM on January 25th of 22 inches ranks as the greatest on record.

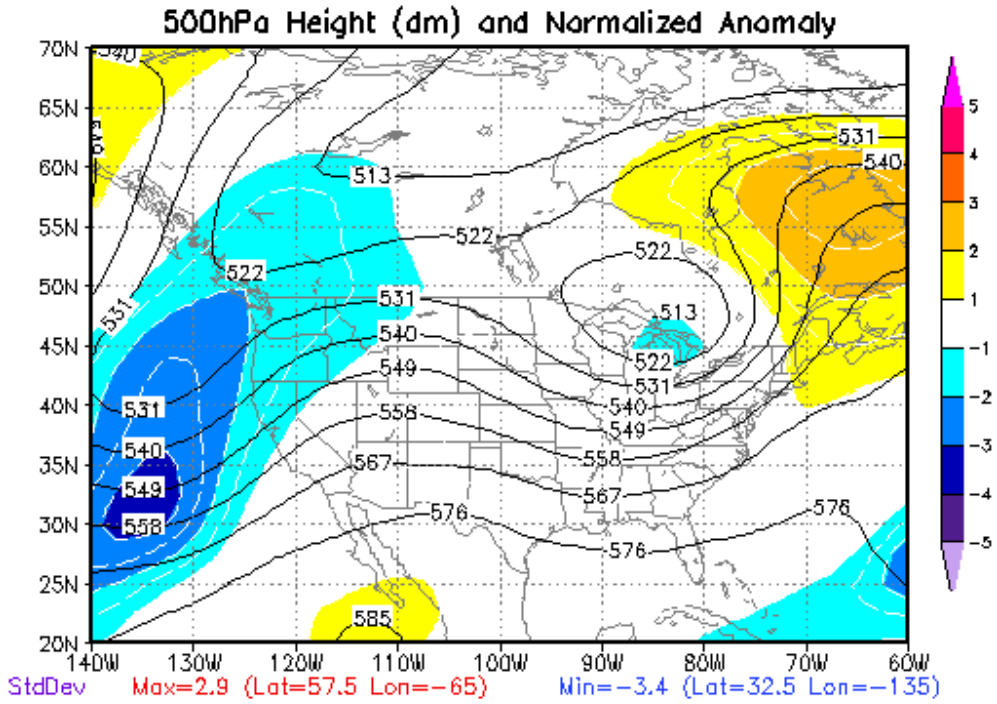


Figure 21 – 500 mb renalaysis map at 12Z January 25, 1969 showing a storm system over the eastern Pacific that produced an all-time record single-storm snowfall at Bishop, California. Black lines indicate 500 mb heights in decameters. Shaded colors show standardized anomalies. Image courtesy Penn State University.

February 23-25, 1969 Storm

The winter of 1968-1969 was an exceptionally active year for storms in California. In the Bishop area, the storm of February 23rd-25th was the second of the two biggest storms that winter. A storm system approaching from the Pacific (Figure 22) accompanied by a feed of moisture produced heavy precipitation, mainly on the 24th. A total of 3.50 inches of precipitation fell that day, making it the second wettest day on record. The total precipitation from this storm was 4.21 inches. Not all of the precipitation fell as rain, as snow from this storm totaled 16.2 inches, which is the sixth largest snowstorm on record in Bishop. The inclement weather hindered travel on Highway 395 in the area with the highway being temporarily closed. This storm helped make the winter of 1968-1969 the snowiest on record in Bishop. Only one other winter has seen more than one event with at least a foot of snow recorded in Bishop, which is the winter of 2004-2005.

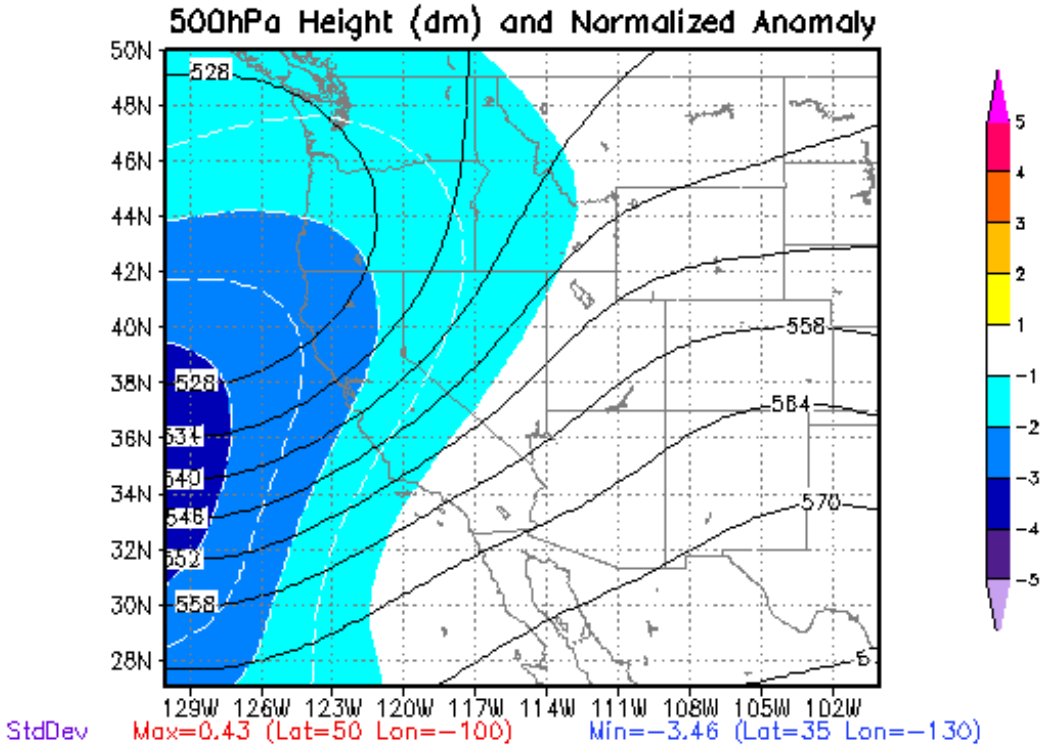


Figure 22 – 500 mb renalaysis map from 00Z February 25, 1969. Black lines indicate 500 mb heights in decameters. Shaded colors show standardized anomalies. Image courtesy Penn State University.

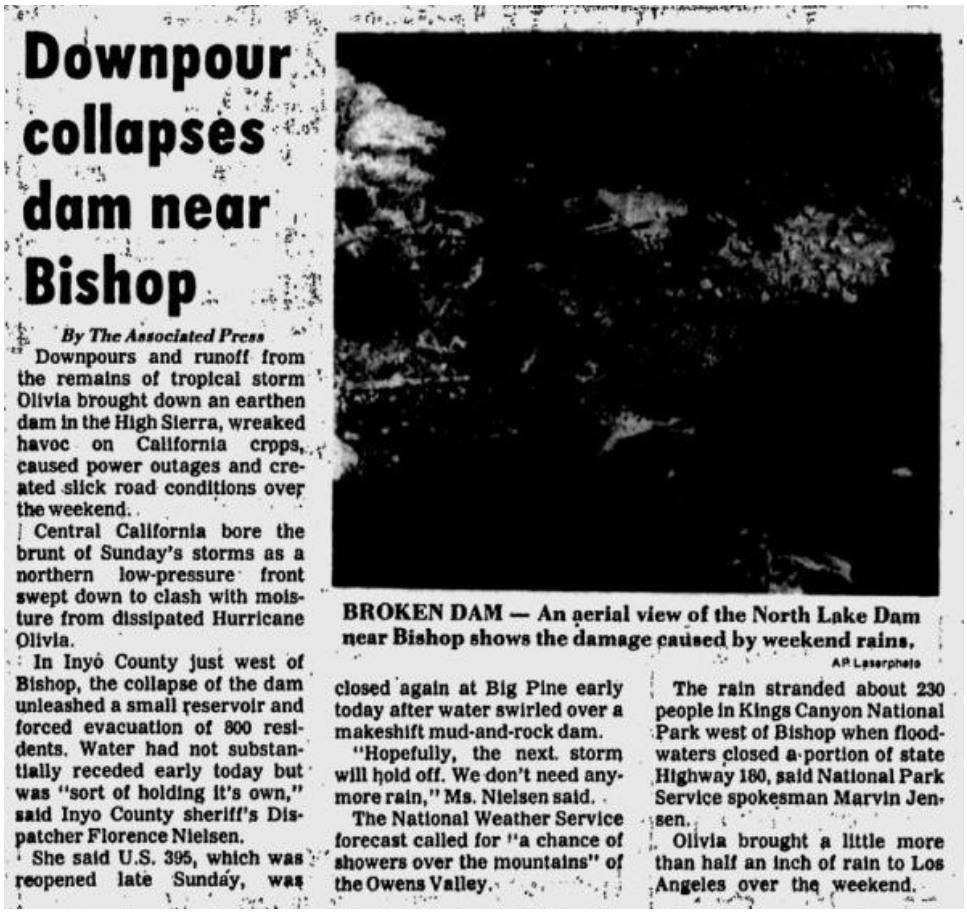
North Creek Dam Failure and Flash Flood, September 24-26, 1982

Tropical moisture worked into central and southern California in advance of Tropical Storm Olivia, which was located off the Pacific coast of Baja California. This resulted in several days of heavy rain across western Inyo County that climaxed on September 25th and 26th. Measured totals of two to four inches fell in the Sierra Nevada at South Lake and Lake Sabrina at cooperative observer weather stations with uncomfirmed reports of seven inches. In Bishop itself, the wettest day was September 24th when 0.73 inch fell at the official climate station.

Runoff from the heavy rain in the Sierra Nevada was enough to erode and eventually bust through an earthen dam at North Lake on Bishop Creek at 9:00 AM on September 26th (Figure 23). The failure of the dam virtually drained the 15 foot deep North Lake of all of its water. Additional runoff further down creek also resulted in a rapid rise on Bishop Creek. A peak flow at a gaging station of 1,750 cubic feet per second was measured which was the highest on record and considered a 150 year flood. By the time the flood reached Bishop, the amount of water had mitigated somewhat.

Although the most significant flooding took place in Aspendell and in the foothills just west of Bishop, portions of Bishop did see flooding. Portions of Highway 395 were closed due to flooding which cut off access into Bishop. In northern and

western portions of Bishop, some 1,700 residents of 200 homes were evacuated by Inyo County Sheriff Deputies who used bullhorns. Numerous hotels and businesses along Highway 395 were also evacuated as a precaution, however, no damage to these was reported.



Downpour collapses dam near Bishop

By The Associated Press

Downpours and runoff from the remains of tropical storm Olivia brought down an earthen dam in the High Sierra, wreaked havoc on California crops, caused power outages and created slick road conditions over the weekend.

Central California bore the brunt of Sunday's storms as a northern low-pressure front swept down to clash with moisture from dissipated Hurricane Olivia.

In Inyo County just west of Bishop, the collapse of the dam unleashed a small reservoir and forced evacuation of 800 residents. Water had not substantially receded early today but was "sort of holding it's own," said Inyo County sheriff's Dispatcher Florence Nielsen.

She said U.S. 395, which was reopened late Sunday, was closed again at Big Pine early today after water swirled over a makeshift mud-and-rock dam.

"Hopefully, the next storm will hold off. We don't need anymore rain," Ms. Nielsen said.

The National Weather Service forecast called for "a chance of showers over the mountains" of the Owens Valley.

The rain stranded about 230 people in Kings Canyon National Park west of Bishop when floodwaters closed a portion of state Highway 180, said National Park Service spokesman Marvin Jensen.

Olivia brought a little more than half an inch of rain to Los Angeles over the weekend.

BROKEN DAM — An aerial view of the North Lake Dam near Bishop shows the damage caused by weekend rains.

AP Laserphoto

Figure 23 – Associated Press News article on the North Lake Dam failure and flooding in Bishop. Image credit: Google News.

Record Cold of December 21-23, 1990

Bishop's all-time record low of 8 below has been reached on two instances: December 27, 1988 and again on December 22, 1990. Unlike the first instance which followed a significant snowstorm on Christmas Eve, the second instance occurred during a completely dry month with no snow on the ground.

A rather deep trough in the mid and upper levels of the atmosphere was carved out across the western United States from December 21st through the 23rd (Figure 24). This allowed Arctic air to descend very far south, reaching all the way into southern California. The low temperatures at Bishop for these three days were -4, -8 and -5. This is the greatest number of consecutive days with a low below zero ever recorded in Bishop. High temperatures each of these days were 24, 35 and 36 degrees respectively.

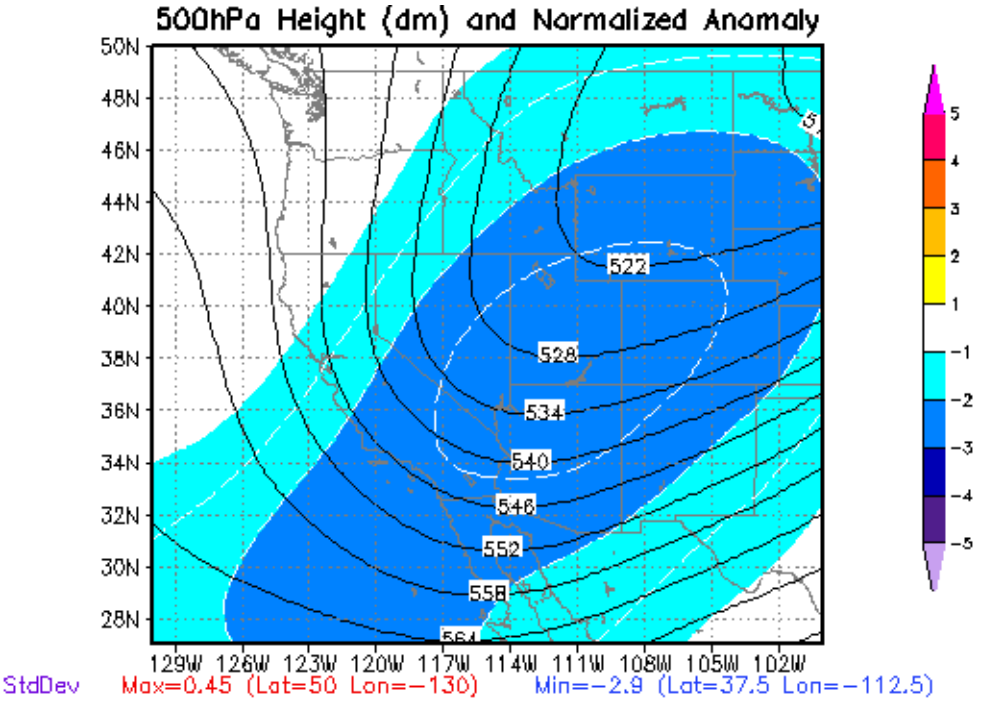


Figure 24 – 500 mb renalaysis map from 12Z December 22, 1990. Black lines indicate 500 mb heights in decameters. Shaded colors show standardized anomalies. Image courtesy Penn State University.

Hottest Temperature Ever – July 10, 2002

Bishop's highest temperature ever recorded of 110 degrees was reached in the late afternoon hours of July 10, 2002. This occurred during a stretch of days that lasted from July 4th through the 16th of that year where high temperatures reached into the triple digits. A sprawling ridge of high pressure centered over the western United States was responsible for this stretch of hot weather at Bishop. Figure 25 shows the 500 mb chart from 00Z on July 11th. On this map, a 600 decameter high pressure was centered over northwestern Nevada.

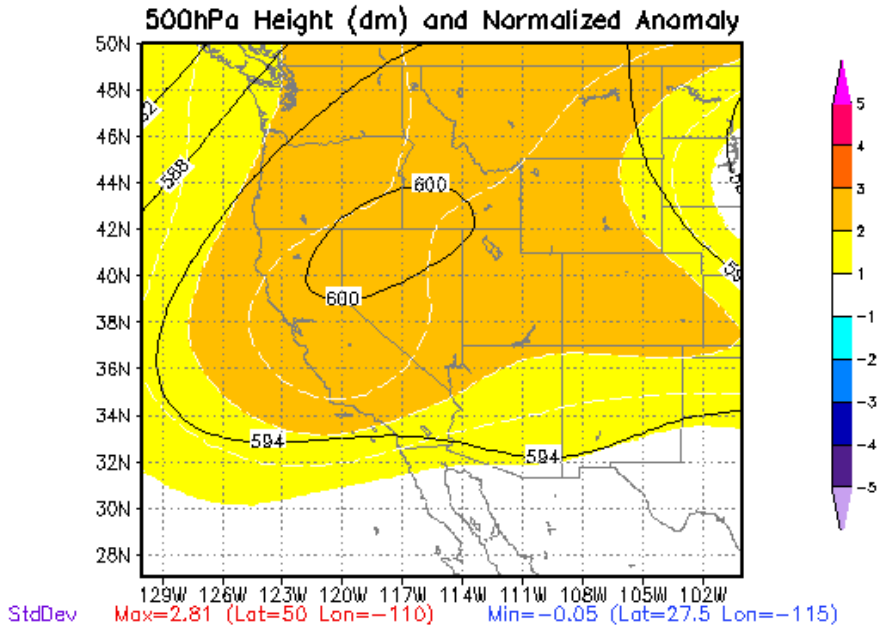


Figure 25 – 500 mb renalaysis map from 00Z July 11, 2002. Black lines indicate 500 mb heights in decameters. Shaded colors show standardized anomalies. Image courtesy Penn State University.

The Wettest Day Ever – January 4, 2008

Bishop's wettest day ever in official weather records occurred on January 4, 2008 when 4.00 inches of rain fell. Precipitation began at 7:45 AM PST as a wintry mix but quickly changed over to all rain by 8:26 AM. Beginning at 11:14 AM, observations reported heavy rain. Heavy rain was reported continuously through 9:56 PM on January 4th. Rain finally ended at 1:23 AM on January 5th.
The highest one hour precipitation amount on January 4th was 0.34 inch which was recorded between 3:00 and 4:00 PM, 6:00 PM and 7:00 PM as well as from 7:00 PM to 8:00 PM.

The heavy rain was caused by a moist flow along and ahead of a cold front that extended from a strong area of low pressure located just offshore of the Pacific Northwest (Figure 26). Precipitation spilled over the southern Sierra Nevada and into the Owens Valley continuously from the late morning into the closing hours of the day (Figure 27). The total rain that fell at Bishop on January 4, 2008 was nearly 77 percent of the normal annual precipitation and wetter than a number of years have been in Bishop. Despite the heavy rainfall, only minor flooding of streets and low-lying areas was reported in Bishop. Some garages were flooded and sandbags were placed along creeks due to minor flooding.

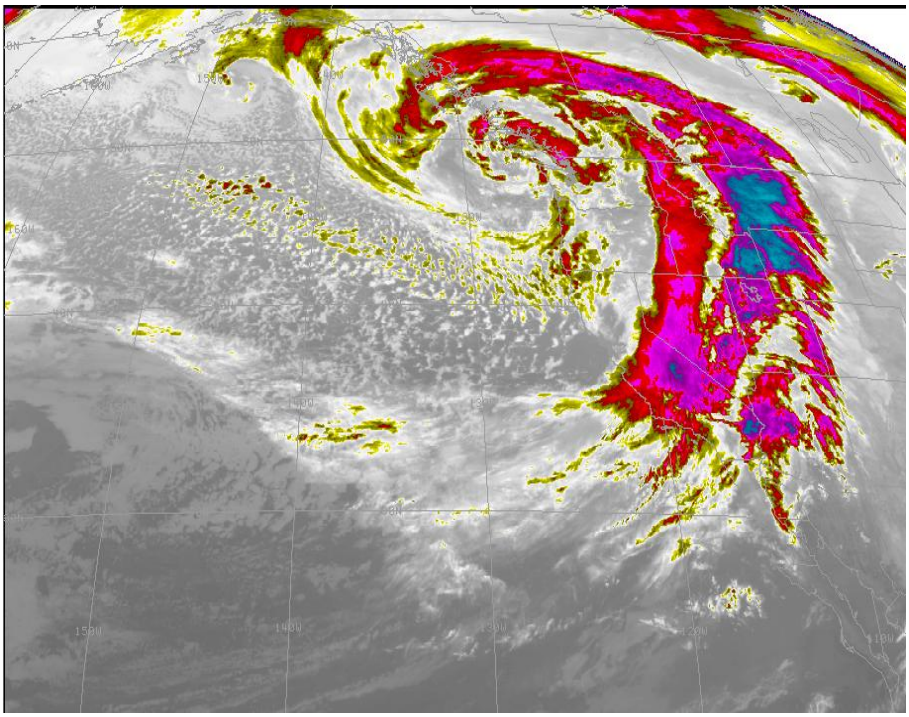


Figure 26 - Infrared satellite image at 0330Z on January 5, 2008 showing an area of low pressure off the coast of Washington. A cold front extends southwest across central California.

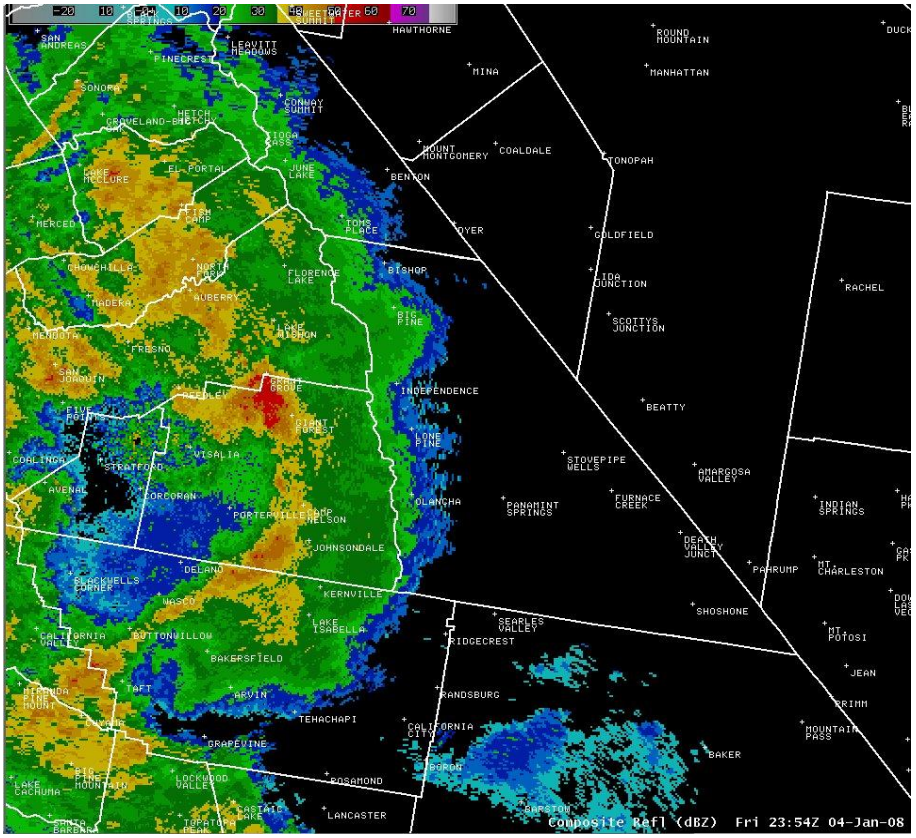


Figure 27 – Composite radar imagery at 23:54Z on January 4, 2008 showing precipitation spilling over the southern Sierra Nevada and into the Owens Valley.

Largest Hail Ever – October 5, 2010

The largest hail ever documented in Bishop fell in the early afternoon hours of October 5, 2010. For about fifteen minutes, hail up to penny size (three-quarters of an inch in diameter) was observed by a spotter located about a mile southeast of the center of Bishop. The thunderstorm that produced this hail was associated with a cold upper-level low that had dropped south towards Baja California and injected a push of late season monsoonal moisture into the Owens Valley.

WSR-88D images obtained from the Hanford, California radar site show a thunderstorm moved northwest across Bishop was responsible for producing this hail. Figures 28 and 29 show an image of the storm around the time it was producing hail at 21:25Z. It should be noted that the radar was sampling this storm from quite a distance away and is also blocked by the Sierra Nevada. Figure 24 shows a cross section of this storm, with a core centered around 18,000 feet.

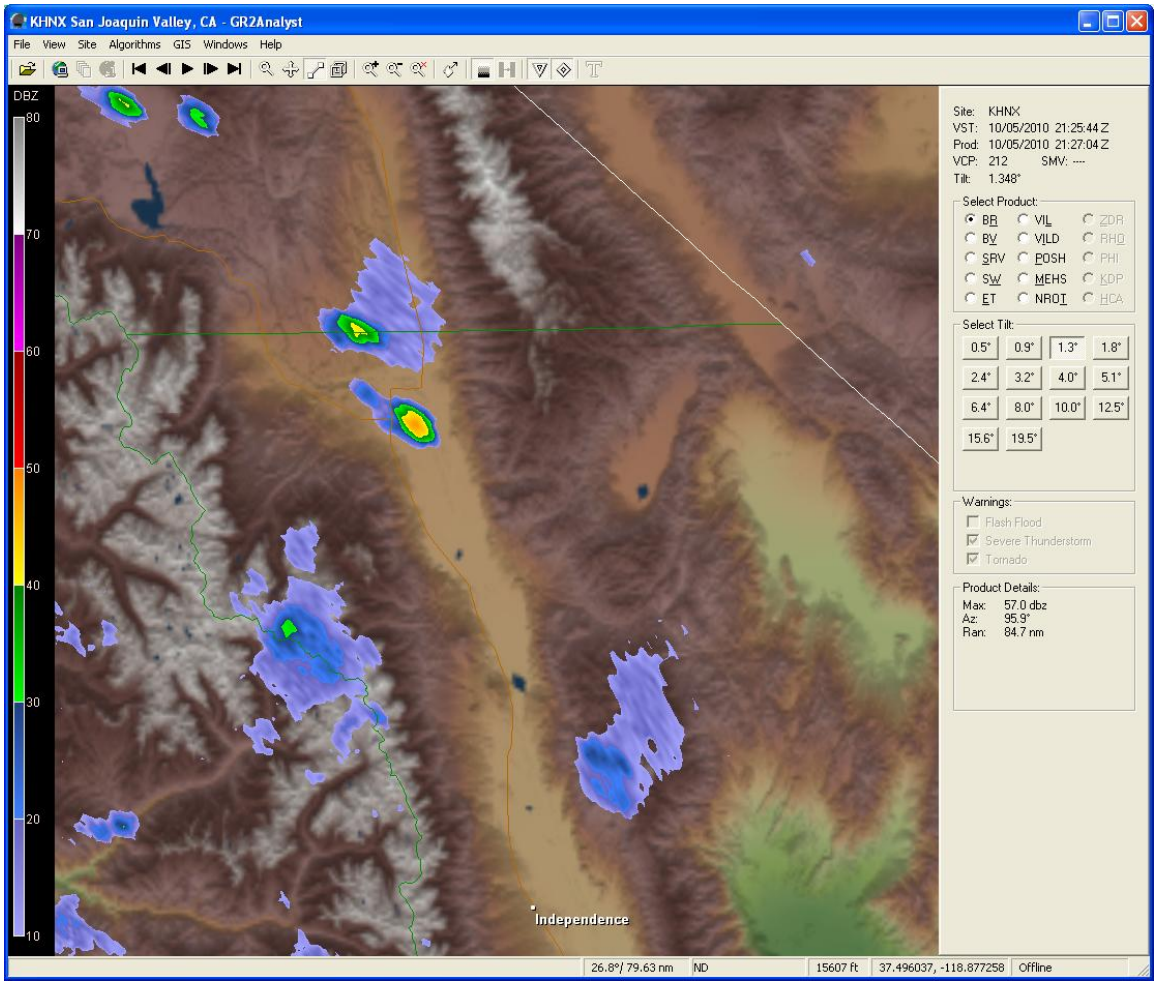


Figure 28 – Hanford (KHNX) WSR-88D 1.3 degree radar image at 21:25Z on October 5, 2010 showing a thunderstorm over southeast Bishop.

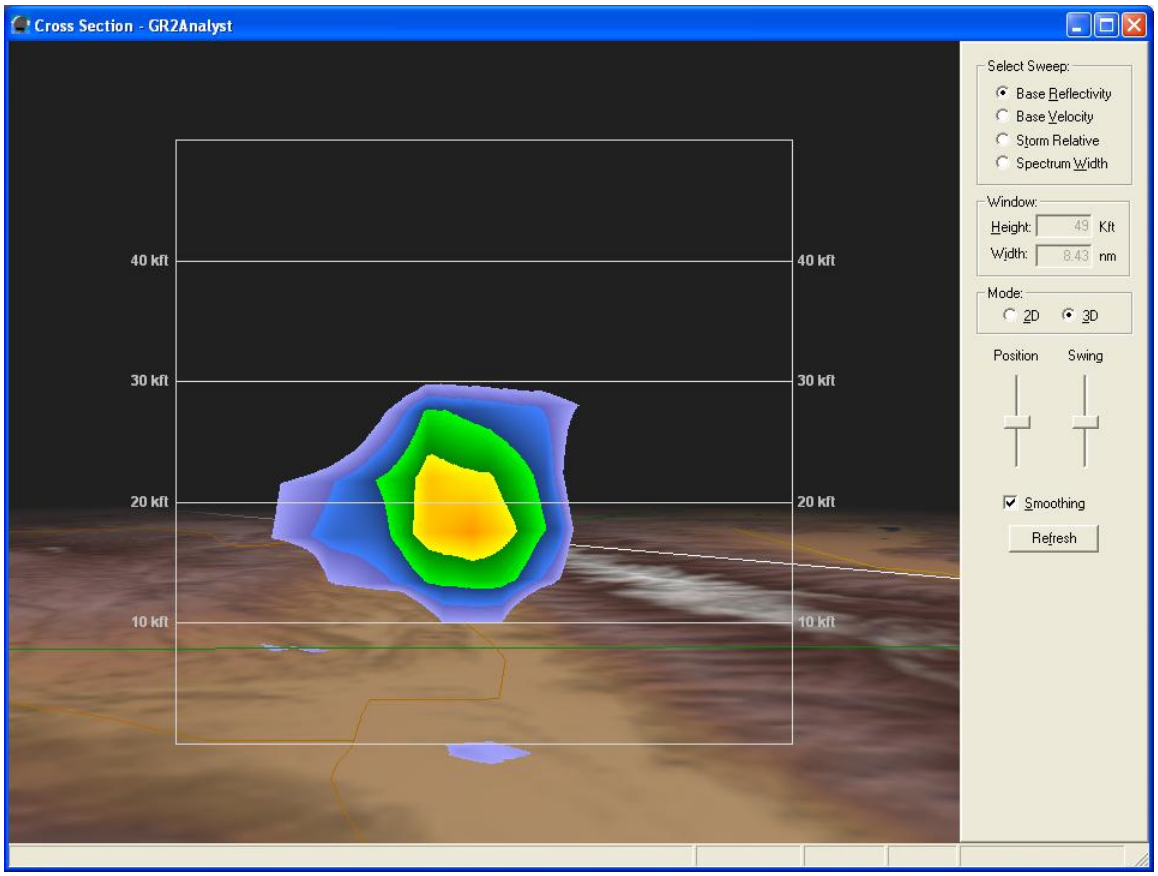


Figure 29 – Hanford (KHNX) WSR-88D cross section of radar at 21:25Z on October 5, 2010 showing a thunderstorm over southeast Bishop.